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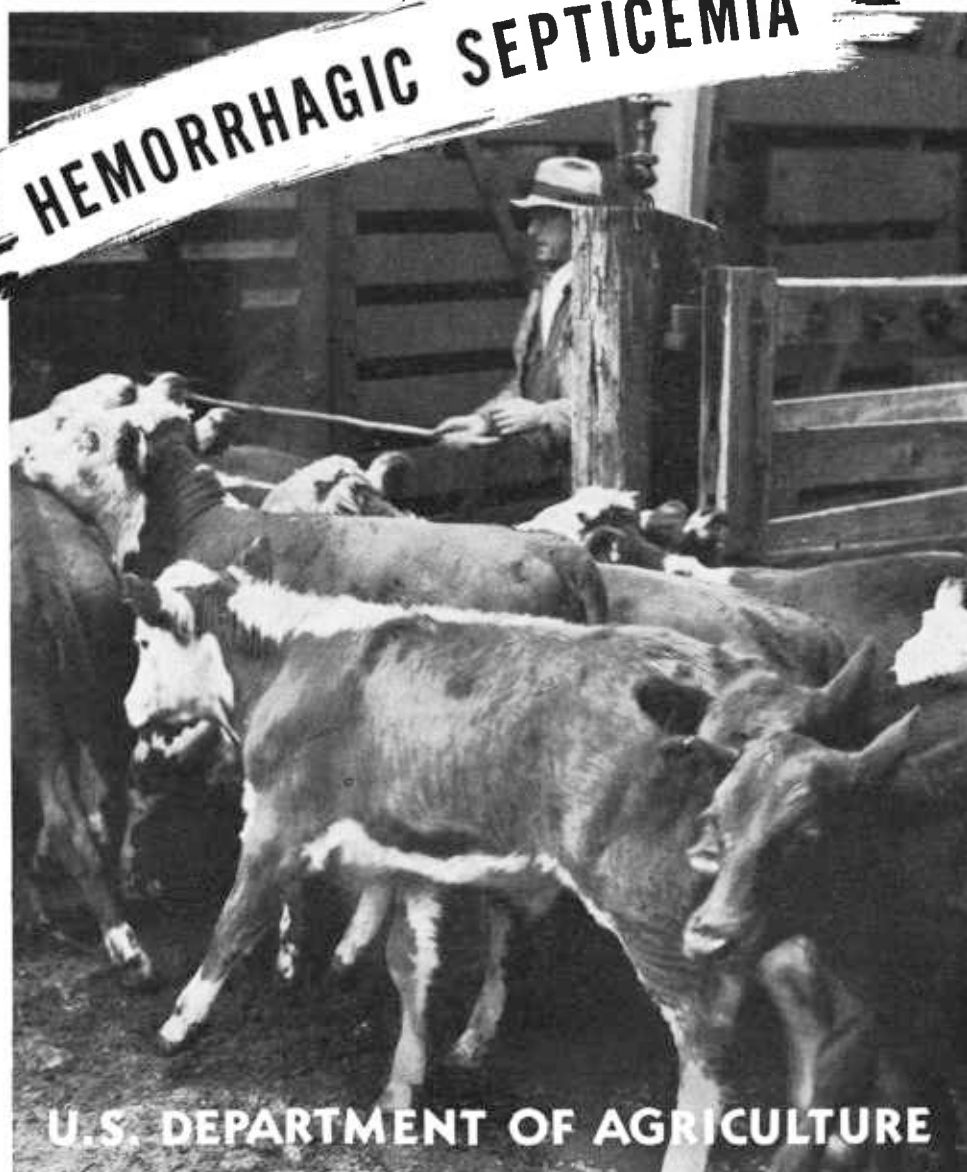
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Shipping Fever of Cattle

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HEMORRHAGIC SEPTICEMIA



U.S. DEPARTMENT OF AGRICULTURE

HEMORRHAGIC SEPTICEMIA, or SHIPPING FEVER, is one of the most serious of a group of cattle maladies that are commonly associated with the hardships and hazards of shipping. Shipping fever is an infectious disease which often terminates in death and is characterized by elevation of body temperature, loss of appetite, a discharge from the eyes and nose, shivering, coughing, general depression, weakness, loss of flesh and, in the late stages, by labored breathing.

The losses from shipping fever can be largely prevented or greatly reduced by careful management in shipping. Therefore, the elimination of predisposing factors to the disease associated with shipping, such as overdriving, overcrowding, overfeeding, and lack of rest, water, feed, and proper shelter during transit, is stressed.

To prevent introduction of infection into stock already on the farm, it is advisable, when making replacements in a dairy herd or fresh additions to a lot of feeder cattle, to isolate the new cattle from the old stock for about 10 days. Vaccination with bacterins at least 10 days before shipping or injection of antiserum may reduce losses.

In actual outbreaks, the apparently healthy animals should be separated from the diseased and placed in clean, uninfected quarters, where they should have the best of feed and water. The sick animals should be kept quiet and housed in warm, dry, and well-ventilated quarters and fed a light ration. These measures may be supplemented by the administration of antiserum.

Bacterins and aggressins injected early after the first animals of large herds become infected, have proved to be effective in some instances in checking the spread of an outbreak. However, the advisability of using these products should be left to the discretion of a competent veterinarian.

HEMORRHAGIC SEPTICEMIA "SHIPPING FEVER" OF CATTLE¹

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INTRODUCTION

SHIPPING FEVER, also known as stockyard fever, is an infectious disease of cattle and sheep usually attended with a high mortality. Its medical name, hemorrhagic septicemia, was given it because it is a septicemia or poisoning of the blood and hence often runs a short, fatal course, and because hemorrhages in the body tissues and organs of animals dead from the disease are usually an outstanding characteristic.

The disease occurs in cattle of all ages in all parts of the United States. Although outbreaks sometimes occur in dairy cattle or range cattle in good condition, the losses appear to be greatest among young animals, especially those whose resistance has been greatly reduced. A large number of outbreaks of shipping fever in cattle are associated with the shipment of animals from one point to another by rail or truck and requiring passage through public stockyards. The vitality of an animal is lowered by the hardships of transit, and its resistance to infection is decreased. The disease is therefore a serious problem to both shippers and receivers of cattle. In some years considerable losses may occur, whereas in other years they are slight.

It is generally believed that weather conditions influence the prevalence of the disease, since cattle appear to suffer from it most in the fall, winter, and early spring during particularly changeable or inclement weather. After prolonged travel under such conditions, for example, they may arrive on the farm of the purchaser

¹ The original bulletin, of which this is a revision, was written by Henry J. Washburn, now deceased.

in a run-down condition though they appeared healthy when purchased in the stockyards. Overcrowding, irregularity in feeding and watering, hard driving, lack of rest and proper shelter, and the general excitement associated with shipping, are other devitalizing factors that may play a part in reducing normal vigor and increasing the susceptibility to shipping fever.

CAUSE

Shipping fever may occur in two forms. The first form, which seldom occurs in cattle, is usually called hemorrhagic septicemia, because it is a septicemia due primarily to infection with the

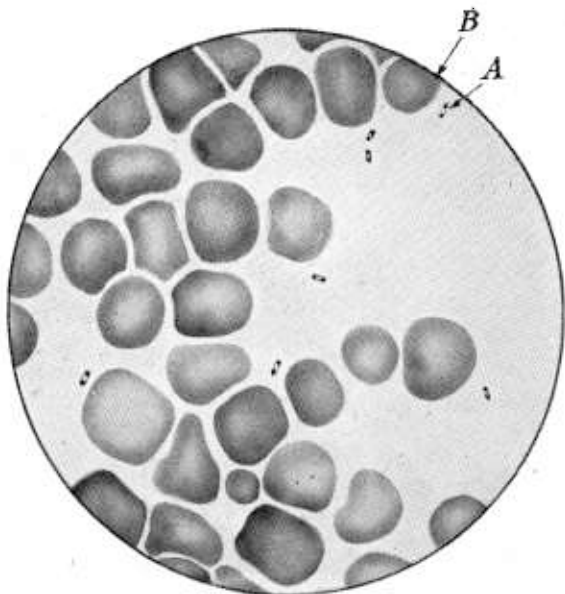


FIGURE 1.—Drawing made from a photomicrograph of blood showing (A) the small, short objects with rounded stained ends, known as hemorrhagic septicemia, or *Pasteurella*, organisms, and (B) the large more or less round objects which are red blood cells. (Magnified about 1,700 times.)

hemorrhagic septicemia organism (fig. 1). This type of the disease has been encountered in the American bison in the United States and water buffalo in other countries. The second form of the disease is commonly known as shipping fever, or stockyard fever, and is associated with the shipment of stock, especially cattle and sometimes sheep.

There is a difference of opinion among both practicing veterinarians and research workers as to the primary cause of shipping fever in cattle. Two theories have been advanced, neither of which has been definitely proved. According to the older school of thought, the principal causative factor is the hemorrhagic septicemia germ, *Pasteurella bovisseptica*. The organism has at times been found in the air passages of normal animals, and organisms

closely resembling it are widely distributed in nature. The theory is that such organisms become virulent under certain conditions and that animals harboring them readily develop so-called shipping fever when their natural resistance is lowered.

According to the newer school of thought, the hemorrhagic septicemia organism probably plays a secondary role, like that of diphtheroids, streptococci, and *B. coli* organisms, and there is another primary infective agent concerned in the production of the disease.



FIGURE 2.—A steer affected with shipping fever, showing typical attitude of dejection.

The nature of this agent is not known, but it is thought by some to be a virus. It has been observed that when cattle are received after a hard railroad journey many of them may manifest symptoms of the disease, and local stock that come in contact with the affected animals very often become infected. Outbreaks may thus occur following replacements in a dairy herd or introduction of new feeder cattle.

Just what part the contamination of yards, buildings, and other equipment by affected cattle plays in setting up the disease in non-infected animals is not known, but undoubtedly this is a source of danger. It is worthy of note that the necessary coexistence of two factors (virus and bacteria) as a causative agent in certain infectious diseases has been recognized in recent years, notably in the case of swine influenza. Furthermore the symptoms of shipping fever in many respects closely resemble those of influenza-type virus diseases occurring in other species.

SYMPTOMS

Shipping fever in cattle usually develops very rapidly, lasting from 2 to 8 days or longer. Affected animals first show an elevation of body temperature, ranging from 104° to 107° F., accompanied by loss of appetite, shivering, muco-purulent discharge from the nose, an occasional hacking cough, distressed breathing, swollen, watery eyes, general depression, gaunt appearance, stiffened gait, and sometimes diarrhea (fig. 2). Within 3 to 5 days after the first symptoms appear, affected animals may develop pneumonia and die in 48 to 72 hours, or the disease may assume a chronic course, in which case the sick animals may linger on for several weeks. In mild attacks, affected animals may recover in a week or two.

During the course of the disease other symptoms may occur. Swelling may appear beneath the skin of the head, throat, or dewlap. These enlargements are somewhat soft and pit on pressure. The tongue is often extensively swollen, and the animal drools and slobbers because of the irritation of its tongue and throat. There may be difficulty in breathing, depending on the degree of involvement of the air passages and of the lungs. Muscular trembling may be evident. There may be a bloodstained discharge from the nostrils, and strings of mucus may hang from the mouth. Examination of the nostrils often reveals the presence of many small hemorrhages, or blood spots, just beneath their lining membranes.

There is an intestinal form in which the changes are found chiefly in the abdominal cavity. This form may develop after the disease has appeared in the lungs. The stomach, intestines, kidneys, and the lymph glands in such cases become studded with hemorrhages of various sizes, and the intestines become intensely inflamed. Diarrhea sets in, and shreds of mucus and bloody droppings are passed. The intestinal form is rare, as most cases show severe involvement of the lungs and the symptoms of croupous pneumonia. The animals may stand with their forelegs wide apart in order to breath more freely. They lose flesh very rapidly, their abdomens become "tucked up," and the eyes quickly become sunken. A staggering gait, caused by extreme weakness, is sometimes noticed.

ANATOMICAL CHANGES

On post mortem examination the following anatomical changes may be observed in the carcass of an animal dead of hemorrhagic septicemia: Swelling of doughy consistency, containing jellylike material tinged with blood, may be found under the skin. If these swellings occur in the region of the shoulder or flank, they are sometimes mistaken for blackleg. The lymph glands are enlarged and hemorrhagic (injected with blood). The mucous membranes lining the nose, throat, and air passages of the lungs are inflamed and may contain bloodstained mucus. Hemorrhages may be observed in the fat tissue around the kidneys and in the serous membranes of the internal organs.

When the disease is chiefly in the chest, the lungs are darkened in color and their fibrous tissues are much thickened from the collection of bloody serum in their meshes. There may be solidification of one or more lobes (pneumonia). The diaphragm, heart sac, and heart walls show numerous bloody points and larger collections of blood.

In the intestinal form, hemorrhages into the intestines are present and sloughing of the lining of the intestinal wall is observed, as a result of which the intestinal contents are wrapped in a covering of bloody mucus.

In acute forms the animals may die suddenly, and the changes in such cases are not very marked. Bacteriological examination of the body fluids may demonstrate the presence of hemorrhagic septicemia organisms.

DIAGNOSIS

It is often difficult to diagnose shipping fever because of its similarity to certain other disease conditions encountered in cattle. However, when animals that have been recently shipped develop symptoms suggestive of the disease, shipping fever should be suspected. Owing to its acute course, high fever, and rapid termination, the disease may be mistaken for anthrax, malignant edema, and blackleg. Although certain characteristic features of these diseases may aid in making a tentative diagnosis, a bacteriologic examination, which includes both cultural tests and inoculation of laboratory animals, is sometimes necessary to detect the nature of the disease and especially to differentiate it from others.

Other conditions in cattle, such as coccidiosis, cornstalk disease, lead poisoning, sweetclover poisoning, and other forms of vegetable poisoning may be mistaken for shipping fever. In an outbreak of suspected shipping fever the diagnosis, treatment, and methods of control should be left to the discretion of an experienced veterinarian.

CONTROL AND PREVENTION

In considering measures for the control and prevention of this disease it is important to remember that shipping fever is the most serious of a group of cattle maladies which commonly result from mishandling, neglect, or exposure of animals in transit or shortly after their arrival at their destination. Hence the elimination of predisposing factors, such as overdriving, overcrowding, overfeeding, and lack of rest, water, feed, and proper shelter during transit, is stressed. To prevent introduction of infection into stock already on the farm, it is advisable when making replacements in a dairy herd or fresh additions to a lot of feeder cattle, to isolate the new cattle from the old stock for about 10 days. Suggestions for reduction of losses due to shipping fever and other diseases of cattle incident to shipping will be found in the following summary of recommendations published in U. S. Department of Agriculture Leaflet No. 38, Maintaining the Health of Livestock in Transit. The recommendations follow:

In the shipment of cattle from the farm to market, the following precautions should be observed:

1. Avoid hard driving.
2. Before loading animals at the loading pens, they should first be rested, then fed native grasses, and finally watered.
3. Avoid rough handling in loading and overcrowding cattle in the cars.
4. In cold weather, provide plenty of bedding in the car and in severe weather, line the side walls of the car with heavy paper for protection.
5. Feed and water at proper intervals en route and allow animals to become well rested when unloaded for feed and water.
6. The common practice of withholding water until animals are very thirsty and thus increasing the tendency to take on a heavy fill is harmful and should be avoided.

The same attention should be given to shipments of stocker and feeder cattle from public markets back to the country.

The vitality of such cattle on arrival may be considerably reduced due to the hardships of travel and they should receive special attention.

1. Provide adequate dry shelter in cold weather, especially if it is wet and stormy.
2. Segregate the animals that appear to be off condition, keep them quiet, place in warm dry quarters, and feed lightly.
3. On arrival give animals access to dry roughage, such as timothy hay, prairie hay, or corn stover for a few hours and then water, but not all they will drink.
4. If they are to be pasture-fed, allow animals to become accustomed to new grasses by permitting only a few hours grazing each day.
5. If they are intended for dry-lot feeding with no pasture available, feed corn fodder and hay for 10 days or longer before starting them on fattening rations.

THE USE OF BIOLOGICAL PRODUCTS

Although the hemorrhagic septicemia organism is generally recognized as the primary and specific causal agent in one form of hemorrhagic septicemia usually not associated with shipping, the cause of the shipping fever form of the disease has not been definitely established. However, on the basis that this organism is associated with both forms of the disease, either as a primary agent or as a complicating secondary factor, biological products (bacterins, aggressins, and antisera) prepared with the hemorrhagic septicemia organism are frequently used in the prevention and control of the disease. Under experimental conditions these products have shown a satisfactory degree of efficacy.

While their use in the field has been attended by considerable success in many instances, in some cases their use had not been entirely satisfactory.

Bacterins and aggressins increase the animal's resistance to infection. It is generally believed that they produce an active immunity of long duration, which is established in 10 days to 2 weeks following vaccination.

On the other hand, the administration of anti-hemorrhagic-septicemia serum, which contains a great quantity of immune bodies, in doses of 50 cubic centimeters as a protective measure, is believed to produce an immediate increase in resistance to the disease. This is a passive immunity of short duration, lasting only a few weeks.

It is a well recognized fact that biological products when used in the prophylactic vaccination of animals against a disease, to be of value, should be given well in advance of the time an animal might be exposed. For this reason, feeder and stocker cattle or other animals that are to be shipped should be treated with bacterins or aggressins at least 10 days to 2 weeks before shipment.

The use of bacterins and aggressins on animals in transit or in the stockyards has not proved successful.

If serum is employed, it should be used a few days before animals are shipped, since it furnishes quick but only a temporary protection. As an added precaution, serum may again be administered to the animals after they arrive at their destination, particularly if some of the animals in the shipment show symptoms of the disease.

A condition called anaphylaxis (shock or severe reactions) may sometimes follow the administration of antisera, aggressins, or bacterins. To avoid this, only homologous serum or aggressin, that is those obtained from bovine species, should be used on cattle and bacterins should be free from toxic products. The advisability of using biological products and the method of administration should be left to the discretion of a competent veterinarian.

TREATMENT

In most cases medicinal treatment of a fully established case of shipping fever is of little value. In visibly sick animals, especially during the early stages of the disease, the administration of large doses of anti-hemorrhagic-septicemia serum (one or two injections of 100 to 150 cubic centimeters or more) will frequently assist in bringing about recovery.

The sick animals should be kept quiet, placed in warm, dry, well-ventilated quarters, be fed a light nourishing ration, and have access to fresh drinking water. All animals that are apparently free of the disease should be removed from those showing symptoms and placed in separate, noninfected quarters. If new cases develop among them in a few days after their removal, the healthy animals remaining should be removed again to another locality. In that way the unaffected animals can be kept out of danger of further contamination.

The administration of sodium bicarbonate has also been reported by some stockmen and veterinarians as being of considerable value in both the treatment and the prevention of shipping fever.

During 1934, 1935, and 1936, sodium bicarbonate administered in the form of a drench, on the feed, or in drinking water, at the rate of 1 ounce per 100 pounds of body weight, once each day for 14 days, was given by stockmen and stockyard officials to several thousand cattle. Some of the animals were treated in the stockyards and others after arrival on the home premises following shipment. A large number of untreated animals in both groups were held as controls.

Reports received by the Bureau covering the treatment of these animals showed little difference between the treated and untreated animals in their resistance to shipping fever.

Although the Bureau of Animal Industry has conducted no experiments to determine the merits of the sulfa drugs, such as sulfanilamide, sulfathiazole, and sulfapyridine, and compounds of guaiacol, and sodium iodide in the treatment of shipping fever, clinical reports from veterinarians in the field indicate that these preparations may have considerable therapeutic value if properly administered during the early stages of the disease.

DISINFECTION OF PREMISES

Since shipping fever is an infectious disease, the carcasses of animals that have died of it should be burned or buried. Premises usually become contaminated by infected cattle that have recently passed through some of the larger cattle markets. All stables, sheds, or yards that have contained infected animals should be disinfected. The interior of the stables, especially the mangers and manure trenches, should be washed with a disinfectant, such as compound cresol solution, 4 ounces to a gallon of water, or carbolic acid, 6 ounces to a gallon of water.

The yards may be disinfected by the application of a solution made of 5 ounces of copper sulphate to a gallon of water. The best way to apply disinfectant solutions is with a spray pump, such as is used in spraying orchard trees. All refuse and material from the stable and barnyard should be removed to a place not accessible to cattle or sheep. The manure should be spread on fields and plowed under. A plentiful supply of light and air should be provided for the contaminated stables. Open fields or pasture lands are cleansed rapidly by the action of sunlight.

IMPORTANT FACTS ABOUT SHIPPING FEVER AND ITS PREVENTION

LOSSES FROM THIS SERIOUS RESPIRATORY DISEASE OF CATTLE ARE GREATEST IN YOUNG ANIMALS WITH REDUCED RESISTANCE. OUTBREAKS FREQUENTLY OCCUR AFTER CATTLE HAVE BEEN SHIPPED LONG DISTANCES OR HELD FOR SOME TIME IN THE STOCKYARDS, ESPECIALLY DURING INCLEMENT WEATHER.

DURING SHIPPING, PROVIDE CLEAN, WELL-BEDDED CARS OR TRUCKS. GIVE THEM FEED, WATER, AND REST AT PROPER INTERVALS. AVOID OVERDRIVING, OVERCROWDING, ROUGH HANDLING, AND EXPOSURE TO EXTREME COLD AND DAMPNESS.

UPON ARRIVAL AT THE FARM, PROVIDE DRY SHELTER, ALLOW NECESSARY PERIOD OF REST, FEED AND WATER SPARINGLY, KEEP NEW STOCK SEPARATED FOR AT LEAST 10 DAYS FROM ANIMALS ALREADY ON PREMISES. ANIMALS THAT APPEAR WEAK OR OUT OF CONDITION SHOULD BE SEGREGATED, PLACED IN WARM, DRY QUARTERS, FED LIGHTLY, AND GIVEN SPECIAL CARE, SUPPLEMENTED BY ADMINISTRATION OF ANTISERUM.

VACCINATION WITH BACTERINS AT LEAST 10 DAYS BEFORE SHIPPING, OR INJECTION OF ANTISERUM IN AMPLE AMOUNTS JUST PRIOR TO SHIPMENT, ALSO MAY HELP TO REDUCE LOSSES.

For sale by the Superintendent of Documents, Washington 25, D. C. Price 5 cents.